

AMERICAN CINEMATOGRAPHER

The Motion Picture CAMERA Magazine



this issue

Wide Range Spot Lamp
Co-ordinating Makeup
Forget Theories says Arthur Todd
Recording and Reproducing
Photography of the Month
... and other features

July, 1935

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What to Read

WIDE Range Spot Lamp by Elmer C. Richardson	282
RECORDING and Reproduction by J. P. Maxfield	284
CO-ORDINATING Makeup with Film by Max Factor	286
MOTHER Nature Knows Best by Harry Burdick	287
NATURAL Color Cinematography by Ray Rennahan	288
FORGET Theories says Todd by James L. Fritz	289
PHOTOGRAPHY of the Month	290

Next Month

- Due to unforeseen circumstances we were not able to give you a reprint of J. I. Crabtree's paper on Polarized Light presented at the recent SMPTE convention. However, we are promised that it will reach us with illustrations in time to be reproduced in our August issue.
- In its place we have given you a description this month of the new Wide Range Spot Lamp which is considered an important piece of equipment in studio lighting.



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Development



Fig. 1, top. Schematic sectional view of a typical 2000-watt condenser spot lamp. Fig. 2, center. Schematic sectional view of a typical 18-inch diameter parabolic reflector lamp with 18-inch diameter parabolic reflector. Fig. 3, bottom. Schematic sectional view of a 210-joule Solaris spot lamp with a 2000-watt globe as a light source.

MOTION picture lighting equipment divides itself broadly into two classifications—the general lighting equipments which are used to fill broad areas with light sufficient to afford general illumination to exposure levels, and spot lighting equipment, in which group would be included all of the various lamps which project beams of illumination which are usually capable of being varied as to their angle of divergency from narrow beams embracing an angle of 8° or 10° up to wide beams having divergencies up to 40°. The spot light equipment is used for back lighting and for projecting light into deep sets where illumination from the general lighting units will not penetrate, also for producing effects such as sun rays through windows, strong light falling from interiors to exteriors, etc. This type of illumination is known as effect-lighting.

For producing the various types of illumination required in the making of a motion picture, a considerable diversity of units have, from time to time, been developed. The requirements have been so diverse that in the course of time studios have gradually accumulated a number of units whose design restricts them to special use which makes them ill-adapted to the average daily problems of the electrical departments.

Spot-light projectors quite logically divide themselves into two groups. In the first group are the reflector type of lamps, which collect the light from the source upon a mirror or reflector whose polished surface converges the light into beams. In this group we have the 18- and 24-inch sun spots, and the various sizes of sun arc equipment. The other type of light-projector uses lenses as a means of collecting the light and projecting it into beams. In this group of equipments we have the various sized condenser spots utilizing Mazda globes as a source, and the high-intensity carbon arc spots. Each of these classes of projection equipment have certain inherent advantages.

The condenser type of spot, which is schematically shown in Figure 1, affords a very satisfactory distribution of candlepower within the beam. The area of illumination projected from this type of equipment is of relatively uniform intensity throughout the area covered, has relatively high intensity in the center of the area, and an intensity which is greatly reduced at the edges of the beam. This satisfactory distribution may be obtained throughout divergencies from 8° up to as wide an angle as 45°. A well-constructed spot lamp having plano-convex lenses, used with Mazda globes as a source. To get the best performance from this type of equipment and incandescent filament globes, it is necessary to fit a spherical mirror behind the globe to utilize the rearward emanations from the filament. This mirror is focused so as to reflect these rays in the form of an image of the filament, to a position between the coils of the filament, where they can be utilized by the condensing lens. The schematic representation in Figure 1, which has been drawn to scale from the layout of a typical 2,000-watt condenser spot, indicates the layout of such a lamp, which is its incapacity to collect a wide angle of light upon the condensing lens. As you will note from the drawing, only 32° of combined reflected light from the mirror behind the globe and direct light from the filament are collected by the condenser when the lamp is focused to a divergency of 8°. When the lamp is flooded to an angle of 40° only 71° of such light is collected. Condenser spots have excellent distribution within the beam but are of very low efficiency as light projectors.

Figure 2 shows schematically a drawing of an 18-inch sun-spot provided with a glass parabolic mirror. Such a reflector-type spot lamp has a useful beam in a narrow divergency of 8°, but when diverged beyond 24° the distribution becomes so defective that it has very little photographic usage. From this schematic layout you will note that as the concentrated beam of 8°, effective illumination

of a Wide Range Studio Spot Lamp

by
Elmer C. Richardson
Male-Richardson, Inc.

of 121° is collected—from one side of the globe only—and on a 24° diverged beam only 116° of illumination is collected. All light from the aperture side of the globe has to be cut off, under present photographic conditions, by means of "spill rings", which are so designed as to only pass projected rays through their cellular construction.

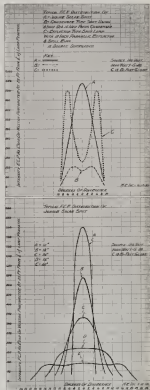
From a study of the schematic layouts of the condenser spots and the projector spots (Figures 1 and 2), it will be noted that the projector spot is much more effective in its collection of light from the source than is the condenser type of spot lamp. The fault of the projector type of equipment is its lack of capacity to afford a good distribution of the projected illumination. The parabolic mirror is a most effective reflecting device when used in narrow divergences and has long been used in search-lights, automobile head-lamps, and such other types of projecting lamps as are

The M.R. Type 210 Junior Subscript with its diaphragm applied.

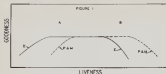


required to project a beam of narrow penetration and high intensity to considerable distances but when the light source is focused within the focal point of a parabolic mirror, as is the case when these lamps are flooded, the major portion of the projected light is sent out in the form of a hollow cone. When a lamp of the reflector type is flooded out to, say, an angle of 20° it is found that the light

(Continued on Page 296)



At top Fig. 4. Graphic representation of foot candle power in the beam of various typical spot lamps when diverged to 15 degrees. At bottom Fig. 5. Graphic representation of the Male-Richardson Type 210 Junior Subscript on beam divergences at 10, 15, 20, 25, and 30 degrees.



IN THE development of sound pictures, as in the case of most applied science, developments usually start with the engineer. They consist, at first in the development of equipment, after which comes the adaptation of this equipment to the particular practical needs of the problem. If the enterprise is of a distinctly engineering nature such as building a railroad or a telephone system, this line of attack is successful, not only in the beginning but throughout the commercial operation. However, when the enterprise consists of the application of engineering equipment to an art, as in the instance of talking pictures, the engineers soon find that the problem includes a large number of emotional as well as purely engineering factors.

The main purpose of sound pictures is to furnish amusement to and to create an emotional reaction in the people who attend their showing. In the engineering of sound pictures, therefore, it is necessary to take into consideration factors that do not come normally into most engineering developments and it is necessary to learn new methods of applying the strictly engineering results in order to produce the necessary emotional response in a large group of people called the public.

For some time past the engineering of sound for motion pictures has been considered from this new point of view. Experiments have been performed in an attempt to determine which of the engineering characteristics of sound reproduction the public likes and also to determine those characteristics which are in general annoying to the listener.

The result of these experiments has made changes in the engineers' ideas of the relative importance of the various purely engineering factors. For instance, two recordings of the same scene may be equally good from an engineering or technical standpoint, but one may be very much better than the other in its ability to produce the proper emotional response from the audience.

This leads naturally to the question, "Can a correlation be found between any of the engineering factors of sound reproduction and the emotional reactions resulting?" If such a correlation exists, it is possible to develop methods of using present equipment to aid the director and actor in planning on the screen, in both picture and sound, the emotional reaction which it was desired to produce in the audience. The results of the work of the last few years have answered this question in the affirmative, namely, it is possible to place certain of the factors on a definite engineering basis.

The technician operating the sound equipment is therefore enabled to start his manipulation and adjustment of equipment on a standard basis and to devote therefrom only for the purpose of producing a particular emotional result desired by the director.

There are two major beneficial results to sound pictures from such a technique, first, the time saved during production to make the necessary adjustments and, second, the fact that on the average better quality of sound and better illusion are obtained without any increased effort or expense.

It should be pointed out that the development of such a technique is not an attempt to engineer art, but is merely

furnishing the operators of the equipment with the means of engineering those factors about which sufficient data exist. This leaves for final adjustment, on the set, only those factors brought about by the requirements of the director's interpretation of the scene.

The engineering factors which have been studied during the last few years with a view to their correlation with the artistic effects are the control of the acoustics of the pickup, frequency or pitch range, and the volume or loudness range.

Acoustic Control of Pickup

The control of the acoustics of pickup include a consideration of the actual acoustics of the space in which the sound is produced and picked up and also the proper placement of the microphone with respect to the source of sound.

It has been well known for a long time that in different sets or different rooms the microphone distance varied even though the resulting effect which was desired remained the same from room to room. It was believed therefore that the correlation between the acoustic properties of the space and the proper placement of the microphone could be determined. This was found to be correct and a formula was finally arrived at connecting the "liveness" of the recording or pickup with the microphone distance and the acoustic properties of the room in which the sound was being picked up.

During the last two years recordings have been made of various types of sound, including speech, solo singing, solo violin, small orchestra, and large symphony orchestras.

The first reliable data came from the experiments carried out with the cooperation of Leopold Stokowski and the Philadelphia Symphony Orchestra. Records were made under varying conditions of liveness. These records were then played to various juries consisting of engineers, musical groups and members of the lay public (by lay public is meant persons who have no technical knowledge of sound and who listen to sound only for the pleasure which it gives them).

From the results of the votes obtained three very interesting conclusions were drawn: first, the engineers, in general, prefer a lower value of "liveness" than do the musicians and lay public, second, that the range of "liveness" acceptable to any one person is quite large and third, that the average range accepted by the musicians and the lay public overlaps the range accepted by the engineers. This is shown schematically in Figure 1 where the group marked "E" represents the range acceptable to engineers and the curve marked "P" and "M" represents the range acceptable to the public and musicians. In this connection, it should be realized that these curves are typical only and that to a certain extent the liveness which is acceptable depends upon the correlation of the sound with the picture.

This leads to the consideration of a factor connected with "liveness," namely, that the greater the "liveness," the further is the apparent source of sound from the listener. For instance, if a voice were recorded with a "live-

Developments

in Sound Recording and Reproduction

by

J. P. Maxfield

Staff Engineer, Electrical Research Products Inc.

Reprinted from April 20, 1935 Technical Bulletin of the Academy of Motion Picture Arts and Sciences.

ness" lying in the region near "A," Figure 1, it would be judged an reproduction as a good closeup voice, if, on the other hand, the same voice had been recorded with a "liveness" in the region of "B," Figure 1, it would be judged as coming from the point fifteen or twenty feet back of the screen. In other words, by the proper control of "liveness" in recording it is possible to introduce a definite fore and aft perspective into the sound to correlate with the perspective existing in the accompanying picture.

In connection with the correlation of the perspective of the sound with the perspective of the picture, there are two factors concerned. The first is the loudness and the second is the "liveness," which has just been discussed.

Experiments have shown that the amount of fore and aft effect obtainable by change of loudness only is quite restricted compared with the range obtainable with the combined use of loudness and "liveness."

Before leaving the discussion of the "liveness" factor, it might be interesting to give the range of "liveness" which the various junes chase for various types of sound sources. The ranges given in the following table refer to the range of the overlap region of Figure 1. The data on which these figures are based were obtained with the cooperation of Leopold Stokowski, Fritz Reiner and others.

Table I

Piano Solo	4 — 8
Symphony Orchestra	5 — 10
Small Orchestra	3 — 6
Violin, Cello, etc.	1.5 — 3
Solo Singing	6 — 12
Speech	2 — 4

The lower figures given in Table I correspond approximately to a medium closeup where a picture accompanies the sound, while the higher figures correspond approximately to a medium long shot. When extreme closeups are desired, a "liveness" of approximately one-half the lower figure will be found suitable, while for extreme long shots, values twice as high as the larger figure will not be too great.

The effect of recording too close results in a tone quality which tends to sound "thin" and "edge" and which lacks what the musicians call the "firmness and roundness" which is so highly desired in good music. This disagreeable effect can, and frequently is, partly cured by modifying the frequency characteristic of the reproduced sound in such a manner as to decrease the intensity of the harmonics which are responsible for the timbre or quality.

It will be noticed from Table I that for the types of sound here listed, the extreme range is from 0.2 to 10, that is, about 50 to 1. Fortunately, this extreme range seldom occurs in any one scene and therefore does not introduce the difficulties which might be expected at first. For instance, a voice accompanied by a full symphony orchestra is not difficult to record on a good scoring stage. If, however, the voice in various parts of the song is to be first in long shot, then closeup, then semi-closeup, etc., it is either necessary to know how the picture will be shot before the scoring is done or to find some means of changing the "liveness" of the voice recording after the records have been made and the picture has been cut.

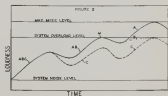
In actual picture production it is frequently customary to pre-score musical scenes and it is therefore necessary to make recordings in such a manner that the perspective can be adjusted in the dubbing process after the picture has been cut. A technique has been developed for accomplishing this result. This technique consists of making two simultaneous records on two separate channels. The first of these recordings should be made with a low enough "liveness" factor to be suitable for an extreme closeup while the second record should be recorded with such a "liveness" factor that it is suitable for an extreme long shot. With these two records available at the time the dubbing takes place, it is possible to obtain any desired "liveness" between the two values originally recorded by the simple expedient of mixing the two tracks in the proper proportions.

The value of this technique cannot be too heavily stressed since it allows to the director complete freedom in the taking and cutting of the picture without reference to the perspective which was originally recorded at the time the pre-scoring was done. The director's use of this freedom in no way detracts from the ultimate illusion produced in the theatre since the dubbing process enables the sound to be adjusted to the picture as the director or cutter has finally arranged it.

Frequency Range

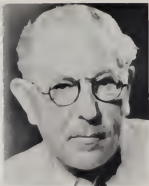
The frequency or pitch range necessary for perfect transmission is large, ranging from approximately 30 vibrations per second (approximately the lowest note on the piano) to roughly 15,000 vibrations per second (nearly two octaves above the top note of the piano). There are other factors entering into perfect reproduction besides merely the frequency range. Two of the more important are: first, volume range, which will be discussed later, and

Continued on Page 197



Co-ordinating Makeup With Film

by
Max Factor



The Author: Max Factor

MOTION picture makeup exists primarily for the purpose of being photographed. Its application, therefore, is inextricably bound up with the same basic factors that govern the photographic process: the type of film being used, the type of lighting employed by the Cinematographer, and the laboratory treatment given the negative film. Any discussion of makeup which does not take these factors into account, must of necessity be more or less superficial—if not actually misleading.

The first makeups used for motion pictures were merely crude modifications of ordinary stage makeup. The predominant color was a pasty yellow, with weird shades of blue or green for eye-shading. There could be no attempt of coordination, as the products of a number of manufacturers were used, applied generally by the players themselves, as there were few, if any, makeup artists in the industry. None the less, as nothing better was available, these materials and practices endured for many years.

With the introduction of Panchromatic film, however, the necessity for a complete reorganization of makeup materials and practice became evident to everyone. The earlier makeups, which had sufficed when the industry was on an Ortho film basis, proved grossly inadequate since colorwork changed to a standard of Panchromatic film and Mazda lighting. In 1928, therefore, the writer gladly accepted the invitation of the Research Committee of the American Society of Cinematographers to participate in the exhaustive tests of Panchromatic film and Mazda lighting made by the A.S.C. and the Academy. Proceeding from a careful study of the speed, color-sensitivity, and other characteristics of the new film, several completely new lines of screen cosmetics were evolved—the first ever compounded exclusively for motion picture use. These makeups were subjected to the severest tests of the industry's most exacting Cinematographers, and the ultimate choice governed solely by the decision of these unbiased judges.

The result was, of course, the present line of Panchromatic Makeup Materials, which have since become the world-wide standard. The outstanding characteristic of these materials is the fact that, from the darkest shade to the lightest, the variation is not of color, but of shade. That is, all are of the same warm tan color, the darker numbers are not obtained by reddening or otherwise chang-

ing the color, but by darkening the shade as a painter would by an admixture of neutral gray. Therefore, all such makeups of whatever shade, will respond uniformly to changes of film, light or filtering.

This brings us back to the question in hand: the coordination of makeup with changes in film, lighting, and other photographic factors.

Motion pictures in Hollywood are made principally on stock produced by three firms—Eastman, DuPont and Agfa. All three are of the type generically known as "Panchromatic" or sensitive to all colors, though of course there are detailed differences in the response of the three products. Within the past few years, all three films have been given greater overall sensitivity and slightly different color-balances in the types familiarly grouped as "Super Sensitive" Panchromatic emulsions. Within the past few months, Eastman has further increased the sensitivity of its product with the introduction of "Super-X" film.

What effect must these changes have on makeup materials engineered for use with the original Panchromatic emulsions?

The ideal Panchromatic emulsion would be one characterized by absolutely uniform response to all colors—that is, one whose spectral response, under spectrometric measurement, would be represented by a straight, level line. In actual practice, spectrophotograms show a somewhat wavy line, yet one which is (even for the earlier Panchromatic emulsions) a relatively close approach to the ideal. The improvements of the past few years have tended not alone to increase overall speed, but to "iron out" some of these irregularities.

Panchromatic Makeup was developed to meet the characteristics of the panchromatic emulsions then available, but its chromatic composition is such that it should also work quite as well with an emulsion attaining the absolute ideal, if one were to be developed. Consequently, these makeups should prove equally adaptable to all of the recent improvements which seek a closer approximation of that ideal.

(Continued on Page 291)



Nick Musuraca, A.S.C.

Mother Nature Knows Best Is Nick Musuraca's Creed

by
Harry Burdick

WITH Italy his natal scene and with a long line of Roman forebears contributing a cumulative heritage of basic culture, it is not at all surprising that Nick Musuraca, A.S.C., should have a deep sympathy for true art forms. Nor that this congenial culture should motivate his tendencies, to the last detail, of contemporary cinematographic creations.

Nor that Musuraca is of the art-for-art's sake category, a devotee to admirable but impractical ideals. To the contrary, Musuraca represents a fine balance between artistic ambitions and the commercial requirements of his profession. But his inborn old-country traits assure an ever-present filtering of a deft artistry and appealing cultural charm into every product of his cinematographic processes, irrespective of whatever restrictive conditions may be imposed by copyrights.

A dissertation as to the fallacy of endeavoring to gild the lily or improve the chromatic content of the rose, might

serve to define Musuraca's fundamental of art interpretation. He believes that Nature, herself, is an artist of no mean ability, having devoted some several centuries to the work, and that one can not go far astray by following her precepts.

Hence, his works etched on celluloid contain the warm breath of nature and life as drenching whatever cold brilliant touches of the theatrical school that may be deliberately injected.

To him, every little shadow has a meaning all its own. It is so in Nature's settings. It is so on Musuraca's sets.

But these shadows must, to him, be Nature's lights and shadows, not primarily the theatre's. Hence, he goes in extensively for effects, resting of course on the tale he has to tell. He is staunch in his pursuit for perfection of detail for of countless correct minute units is the composite picture composed.

He is wholly unconcerned with straight or so-called brilliant photography. He has yet to see, in Nature, a setting continuously swamped under blinding light. Instead, he finds an ever-fascinating gradation of light tone, an infinite variety of changing effects. These, he proposes to relay to the screen.

And so he frequently dares to ignore some of the old stereotyped traditions that are offspring of stage mechanics but are still the stock in trade of all too many film fashioners.

On divers occasions he has taken his main character entirely out of the customary stream of light, with every expression blatantly set forth, and let the face go dark. The actor's pet grimaces were meticulously shrouded by an absence of revealing light.

A person does not go through life nor through even a series of events with his face constantly bathed in light. There are times, in ordinary course, when that person's face may be initially in shadow. If so in Nature, why not, queries Musuraca, on the screen?

An interesting instance of this took place a few productions back. He took an entire scene with his star's face black. He established the star entering a dimly illuminated presumably only by scattered beams from a street-lamp penetrating the window. He established the star's presence in the room by taking him through the shaft of light. But during the star's telephone conversation, the reason for his coming to the room, his face was in full shadow. The audience knew he was there, could hear his words.

But Musuraca held his face quite dark, the expressions indefinable. For the simple reason, he contended that a person's face need not necessarily be highlighted every time he uses a telephone, indeed, light is entirely foreign to the business of speaking into one.

The star was not particularly pleased that his carefully put on expressions were lost in shadow, nor did the studio importuns enthuse. But when audiences gave eye to the screening thereof, the reviewers heaped high praise on this and several similar effects. It's the way such things actually are staged by Nature, rather than by a steeped-in-ancient fabricator of matters theatrical.

One of the pioneer trail-blazers of the cinematographic profession—his intermedium dates to the first Vitaphone era—he is surfeited with scenic artificiality and posing of actors. He strives to capture spontaneity in action and mannerism. To this end, he does not favor too intensive or rigid rehearsal drilling. He prefers to have his characters

(Continued on Page 295)



Ray Reenahan, Chief Cinematographer with Technicolor

Natural-Color Cinematography Today

by
Ray Reenahan

THE starting-point for any discussion of modern natural-color Cinematography should be frank recognition of the fact that for all practical purposes today's three-color process is absolutely new, and has relatively little in common with yesterday's imperfect two-color systems. The addition of the third color has not merely widened the range of color-reproduction but has made the process infinitely more practical, and opened immense new fields for artistic expression.

The process has fewer limitations, and accordingly places fewer restrictions upon its users. In the old days "juggling" colors was unescapable, for the process could not reproduce all colors faithfully, and we had to substitute an unnatural tint for some hue we knew the process could not reproduce truly. This is done away with in to-

day's three-color process, and the Cinematographer can concentrate his attention upon painting his compositions with living colors.

The foundations of any photographic process are exposure and development. In the three-color Technicolor process, the negatives are developed to unvarying standards. Therefore, in order to assure that the three negatives will consistently maintain the correct gamma, the exposure must be maintained with scientific constancy. This is done by the use of accurate, photoelectric illuminimeters. In comparison with accepted black-and-white standards, a somewhat higher level of illumination is necessary, but the increase is by no means extensive, and even so, it is being steadily diminished by the advancing speed of lenses and emulsions. Some of the heavier lighters would probably find that the transition from black-and-white to color required only the slightest modification of their normal lighting.

Our interior scenes are at present made under arc lights. Notwithstanding the fact that incandescent lighting is the accepted standard in monochrome Cinematography today, I feel that there are several important advantages in the use of arcs. In the first place, hard light, as used in our work, is a much closer approximation of natural light than is incandescent light. Therefore, by standardizing on arcs for the illumination of our interior scenes, we are able to use the same cameras for both interiors and exteriors. Otherwise, the change in the spectral emission of natural and incandescent light would be so great as to force us to use either different cameras, or special filters, or other modifications which would restrict us considerably. Secondly, the arcs, since they emit so few of the red and infra-red (heat) frequencies, are vastly cooler to work under and place less physical strain on the players. When Super-sensitive film first appeared, one of the greatest points in its favor was that it required fewer lights, and accordingly less heat. Technicolor, while requiring more light, eliminates virtually all the heat. The old bugaboo of "klieg eyes" has been banished, by using a plain glass cover over all lamps, we filter out the optically dangerous wave-lengths. Open arcs are never used on a Technicolor set—and since the introduction of the three-color process we have never had a single case of "klieg eyes."

No set style of lighting is required, a Cinematographer may employ whatever lighting technique he may prefer. Personally, I have found that I get the best results in color if I light with a trifle more brilliance and contrast, with a stronger separation of planes, than I'd do in black-and-white. Color photography does not lend itself well to overly flat or soft lightings. The shadows, too, require rather more careful balancing than in black-and-white unless a certain level of illumination is maintained in such areas, there is considerable danger of losing all shadow detail. You can't rely on "spilled light" to take care of your shadows in color to the extent you can in monochrome. Shadows also tend to change the color-values in such shaded areas.

The use of colored light is a phase of lighting which has no parallel in black-and-white technique. The means of course, is simple, merely placing gelatin screens of the desired color over the lamps. This projected color may be confined to a small area, or spread over the entire set, as the circumstances may dictate. Obviously, this technique offers many opportunities for startling pictorial and dramatic effects, but it should be used with restraint. We

(Continued on Page 294)

"Forget Theories"

Says Todd

by

James L. Fritz

Formerly dramatic editor St. Louis Post-Dispatch



Arthur Todd, A.S.C.

TODD tells us when he begins work on a picture, he forgets photographic theories, he forgets artistic affects, and above all he forgets himself. He strives for one thing—to keep everything in character. He never allows any one thing to become detached from the feeling and mood of the story. His treatment of the subject is the same as his treatment of the story. Todd if he is given sufficient notice before beginning work on a particular picture, endeavors to become fairly well acquainted with the stars he will be called upon to photograph. This is done, so that he will be able to understand their respective personality and character. It is important for the cinematographer to be a diplomat as well as a psychologist, Todd tells us. For if he is going to keep the story as the principal thing of the production, he must be able to handle the subject in such a way that without allowing the subject to fade into oblivion he will be able to blend the subject's personality into the characterization required and the story will be preserved as the all-important factor.

Todd also believes, the highest tribute which can be paid to a cinematographer by an audience, is, when asked what he thought of the photography, any member of the audience will state that he did not even notice the photography. By making this statement, the public will admit that the story and picture proved so entertaining and interesting, and so well balanced, no one person or one factor was allowed to predominate. Todd claims this balance rests solely upon the ability of the cinematographer. If the cinematographer becomes too engrossed in striving to obtain artistic effects, in the obtaining of any one quality, or in clothing one subject with a dominating personality, the entire production loses its balance and ceases to be good entertainment. When the average audience goes into the theatre, they do not go to study or think, they do not wish to become absorbed in one phase or factor of the production, but instead they wish to be entertained and amused. And it is only through perfect balance that this desired result can be obtained.

Todd claims, there could be good pictures without good photography, but there can never be good photography and bad pictures. The merit of the picture does not depend upon the cinematographer's ability and knowledge, but upon the co-operation with which the entire company works. On the other hand, regardless of the skill of the cinema-

matographer, if the story is not good, if the subject's characterization is not in keeping with the subject's real personality, and principally, if the people working on the production do not co-operate with each other in every way, the final product will not, and cannot be a good picture.

It is because of this necessary co-operation, that Todd believes there is no place for artistry behind the camera. He would far rather be called an able craftsman than an artist. His every consideration is for the studio—for it is studio money which makes it possible to work behind the camera. It is studio co-operation which has brought the cinematographer into public notice, and no tradesman has any right to experiment for self glory on company money and time. Todd refers to the cinematographer as a tradesman, because this is just what he considers the profession to be, a very technical trade. He believes a carpenter, a plumber, or a silversmith, if he has become proficient in his trade, is equally as artistic as any cinematographer.

Todd admits, he does experiment with photography, but only on his own time and with his own money, on 16mm film. He recognizes the fact that lighting plays an all-important part in the cinematographer's work, and with the film company's constant changing of emulsions, constant research and experiments by the cinematographer, are necessary, so there will be no waste of film or loss of time when the cinematographer is called into production. Todd feels every cinematographer should become acquainted with either 8mm or 16mm film. It is not only an inexpensive method of experimental research, but also an excellent way for the cinematographer to improve his efficiency.

Todd is sure that there is a growing demand in the studios for young men with sufficient ambition and common sense. If the embryo cinematographer can forget artistic theories and timidity, if he can forget the glamour of motion pictures, and confine himself to hard work as if he were going to follow any skilled trade, he will soon find himself on top in the cinematographic world. It is because of this belief that Todd is ever conservative.

—Continued on Page 282



PHOTOGRAPHY

of the MONTH

'HOORAY FOR LOVE' (Radio)

Lucien Andriot, A.S.C. (Directing Cinematographer)
Hollywood Reporter (May 16, 1935): "Lucien Andriot's photography is happiest while focused on Ann Southern."
Daily Variety (May 16, 1935): "Camera work by Lucien Andriot is of particularly high order, with some trick shots that reflect a thorough knowledge of photography."

'OUR LITTLE GIRL' (Fox)

John Seitz, A.S.C. (Directing Cinematographer)
Hollywood Reporter (May 17, 1935): "John Seitz's photography is uniformly good throughout."
Daily Variety (May 17, 1935): "Photography of John Seitz is one of the better elements of the picture."
Film Daily (June 7, 1935): "Photography, Good."

'FRANKIE AND JOHNNIE' (RKO)

Joseph Ruttenberg, A.S.C. (Directing Cinematographer)
Hollywood Reporter (May 20, 1935): "Joseph Ruttenberg, the photographer, reels applause for magnificent magic."

'AGE OF INDISCRETION' (MGM)

Ernest Haller, A.S.C. (Directing Cinematographer)
Film Daily (May 18, 1935): "Photography, A-1."

'AWAKENING OF JIM BURKE' (Columbia)

Benjamin Kline, A.S.C. (Directing Cinematographer)
Film Daily (May 18, 1935): "Photography, D.K."

'PARTY WIRE' (Columbia)

Al Seigler, A.S.C. (Directing Cinematographer)
Film Daily (May 17, 1935): "Photography, First rate."

'FIGHTING SHADOWS' (Columbia)

George Meahan, A.S.C. (Directing Cinematographer)
Film Daily (May 17, 1935): "Photography, Good."

'IN SPITE OF DANGER' (Columbia)

Benjamin Kline, A.S.C. (Directing Cinematographer)
Daily Variety (May 24, 1935): "Photography is Okay."

'IT'S A SMALL WORLD' (Fox)

Arthur Mil, A.S.C. (Directing Cinematographer)
Film Daily (May 21, 1935): "Photography, Okay."

'MOTIVE FOR REVENGE' (Majestic)

Herbert Klinkpatrick, A.S.C. (Directing Cinematographer)
Film Daily (May 21, 1935): "Photography, Good."

'PARIS IN SPRING' (Paramount)

Ted Tetzlaff, A.S.C. (Directing Cinematographer)
Daily Variety (May 25, 1935): "Ted Tetzlaff's photography approaches as one of the finest cinematic jobs of the year."
Hollywood Reporter (May 25, 1935): "The Tetzlaff photography is A-1."
Motion Picture Daily (May 27, 1935): "Theodore Tetzlaff's photography is good."

'GINGER' (Fox)

Bert Glennon, A.S.C. (Directing Cinematographer)
Hollywood Reporter (May 25, 1935): "Photography conforms to Bert Glennon's high standard."
Daily Variety (May 25, 1935): "Bert Glennon's photography is top notch."

'THE ARIZONIAN' (Radio)

Harold Wanstrom, A.S.C. (Directing Cinematographer)
Daily Variety (May 27, 1935): "Harold Wanstrom welds a splendid camera."

'COLLEGE SCANDAL' (Paramount)

Theodor Sparkuhl, A.S.C. (Directing Cinematographer)
Daily Variety (May 25, 1935): "Theodor Sparkuhl has used his camera very effectively."



Bert Longworth, A.S.C. (right) and Maxwell Geston, A.S.C. (left) show the authors was not taken in front of a gross screen. Mrs. Longworth, left, and Mrs. Geston (right) claim they will appear as character witnesses in case —

'THE GIRL FROM 10TH AVENUE' (First National)

James Van Trees, A.S.C.: Directing Cinematographer
Film Daily (May 25, 1935) "Photography, Good"

"MISTER DYNAMITE" (Universal)

George Robinson, A.S.C.: Directing Cinematographer
Film Daily (May 25, 1935) "Photography, Good"

"LET 'EM HAVE IT" (Reliance-United Artists)

Reverell Marley, Robert Plonck, A.S.C.: Directing Cinematographers
Hollywood Reporter (May 31, 1935) "Photography is excellent"
Daily Variety (May 31, 1935) "Photography by Reverell Marley and Robert Plonck is up to general level of picture's excellence"

"CHARLIE CHAN IN EGYPT" (Fox)

Daniel Clark, A.S.C.: Directing Cinematographer
Hollywood Reporter (May 31, 1935) "Dan Clark's photography has a tropical brilliance about it that adds to the atmospheric realism"
Daily Variety (May 31, 1935) "Daniel B. Clark has used his camera effectively"
Film Daily (June 4, 1935) "Photography, Fine"

"NO MORE LADIES" (Metro)

Oliver T. Marsh, A.S.C.: Directing Cinematographer
Hollywood Reporter (May 31, 1935) "The direction is excellent, as is Oliver Marsh's photography"

"THE RAVEN" (Universal)

Charles Shumir, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 1, 1935) "Charles Shumir's photography is excellent and the texture stuff well staged and camera-tricked"
Film Daily (June 4, 1935) "Photography, A-1"

"LOVE ME FOREVER" (Columbia)

Joe Walker, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 3, 1935) "Photography by Joe Walker is splendid"

"CHINATOWN SQUAD" (Universal)

George Robinson, A.S.C.: Directing Cinematographer
Film Daily (May 31, 1935) "Photography, Good"

"KEEPER OF THE BEES" (Monogram)

Harry Neumann, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 5, 1935) "Harry Neumann's photography is beautiful"
Daily Variety (June 5, 1935) "Harry Neumann has photographed very well"
Film Daily (June 11, 1935) "Photography, A-1"

"UNDER THE PAMPAS MOON" (Fox)

Clayton Lyons, A.S.C.: Directing Cinematographer
Film Daily (June 1, 1935) "Photography, Fine"

"THE FLAME WITHIN" (MGMA)

James Wang Howe, A.S.C.: Directing Cinematographer
Film Daily (June 1, 1935) "Photography, Fine"

"MURDER IN THE FLEET" (MGMA)

William Siskner, A.S.C.: Directing Cinematographer
Film Daily (June 1, 1935) "Photography, A-1"

"AIR HAWKS" (Columbia)

Henry Freulich, A.S.C.: Directing Cinematographer
Film Daily (June 1, 1935) "Photography, Good"
Daily Variety (June 13, 1935) "Henry Freulich's camera deftly helps in creating a diverting action film, with technical angles well handled"
Hollywood Reporter (June 14, 1935) "Henry Freulich's photography is just another asset to an entertaining picture"

"MEN OF THE HOUR" (Columbia)

Benjamin Kline, A.S.C.: Directing Cinematographer
Daily Variety (June 6, 1935) "Photography of Ben Kline is very good"

"ALIBI ICE" (Warner)

Arthur Todd, A.S.C.: Directing Cinematographer
Daily Variety (June 7, 1935) "Arthur Todd has done a bang-up job with the camera, using it shrewdly to whip up excitement"
Hollywood Reporter (June 8, 1935) "First-rate camera work by Arthur Todd"

"FARMER TAKES A WIFE" (Fox)

Ernest Palmer, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 10, 1935) "The photography of Ernest Palmer

will get plenty of mention at the time the Academy Award is made. Shooting with a background of inspired set building, the photographs were an assemblage of beauty"

Daily Variety (June 10, 1935) "Ernest Palmer can grab a handful of laurel leaves for his slick photography, especially for some moving scenes in the mist along the towpath"
Film Daily (June 11, 1935) "Photography, Best"

"BORDER BRIGANDS" (Universal)

William Siskner, A.S.C.: Directing Cinematographer and **Allen Thompson, A.S.C.:** Operative Cinematographer
Motion Picture Daily (June 6, 1935) "The camera work of William Siskner and Allen Thompson is particularly good, and doubly so on the outdoor shots"
Film Daily (June 4, 1935) "Photography, Good"

"JUSTICE OF THE RANGE" (Columbia)

George Meskon, A.S.C.: Directing Cinematographer
Film Daily (June 4, 1935) "Photography, Good"

"THE NITWITS" (RKO)

Eddie Creager, A.S.C.: Directing Cinematographer
Film Daily (June 5, 1935) "Photography, A-1"

"ORCHIDS TO YOU" (Fox)

Meritt Gerstad, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 10, 1935) "Photography by Meritt Gerstad is above standard and the production is capital"

"CALM YOURSELF" (Metro)

Leslie White, A.S.C.: Directing Cinematographer
Daily Variety (June 10, 1935) "Leslie White has photographed very well"

"HONEYMOON LIMITED" (Monogram)

John W. Boyle, A.S.C.: Directing Cinematographer
Hollywood Reporter (June 12, 1935) "Consistently good photography by John W. Boyle"
Daily Variety (June 12, 1935) "Photography is excellent"

"PEOPLE WILL TALK" (Paramount)

Alfred Gilks, A.S.C.: Directing Cinematographer
Film Daily (June 7, 1935) "Photography, A-1"

Developments in Sound Recording and Reproduction

(Continued from Page 285)

second, the reproduction of the sound in its correct position in space. The frequency range available, at present, in the Western Electric Wide Range system is from 55 to 8000 vibrations per second. While this is not as wide as the range required for completely perfect transmission, it is sufficiently wide to reproduce a very large part of the emotional content of the scene being depicted by picture and sound.

With reference to the frequency range, one very interesting engineering factor of emotional value to the public is met with. If the higher harmonics are reproduced satisfactorily (commonly called "cleanly"), they constitute a distinct asset to the reproduction. If, on the other hand, they are reproduced improperly, or if the higher harmonics are obtained by non-linear distortion of lower frequencies, the public strenuously dislikes them and would much prefer to have them missing altogether. Throughout all of our tests during the last few years this factor has been constantly encountered and has been one of the real difficulties which had to be overcome before an extended range of frequencies was usable commercially.

Volume or Loudness Range

The volume range for the reproduction of a symphony orchestra is somewhere in the neighborhood of 70 to 80 db. Unfortunately, the present commercial equipment has a considerably smaller range and it is therefore necessary to compress the volume range during the recording process.

Musicians have consistently complained that this compression of volume range greatly lowers the emotional value of music reproduction. A study was therefore made to determine whether or not a method of volume compression could be found which would do to the emotional reaction of the audience to the reproduction a minimum of damage. Some of the earlier experiments performed about 1929-30 indicated a line of attack which showed promise in this respect. During the winter 1931-32 experiments were carried out in cooperation with Leopold Stokowski and the Philadelphia Symphony Orchestra and engineers of the Columbia Broadcasting System with a view to determining a method of volume compression which would do the least damage to the music reproduction of the orchestra broadcasts.

The older and more common method of compression, where a crescendo was involved, was to wait until the volume approached the danger point (overload) and then, by use of control dial, to hold it down within safe limits. A reference to Figure 2 will make this clear. The line near the bottom of the figure labeled "System Noise Level" represents the

lowest level which can be reproduced without serious disturbance from background noise. The line labeled at the left "System Overload Level" represents the loudest sound that can be reproduced without an overload of the equipment. The second line at the top of the figure, labeled at the left "Maximum Music Level," represents the level which would have to be reproduced if no change in the control dial were made during the playing of the crescendo illustrated in the figure. The full line "A" represents the loudness plotted against time for the actual crescendo as played by the orchestra. The line "B," which for a considerable portion of its distance coincides with the line "A," shows the older method of volume control. The line "C," which also coincides for a small portion of its distance with line "A," represents the recorded volume in accordance with the new method of control.

The procedure in the case of the experiments leading to this new method was somewhat as follows. During the Friday afternoon concert preceding the broadcast, the volume was controlled in the manner shown by the line "B" and a musical score of the selection was marked to show, first, the measure at which the change must be made in order to avoid overload and, second, the amount of compression required to avoid overload.

This marked score was then taken to Mr. Stokowski and he indicated on the score the measures at which the compression should take place and the amount of compression that should take place during these measures. During the broadcast the mixer merely followed Mr. Stokowski's markings on the score.

After the season's broadcasts, a study was made of the volume control as finally used and among other results one very interesting one was discovered. Practically none, or at most very little, of the decrease in volume during the crescendo was made while the orchestra was itself increasing in loudness. Reference to Figure 2 indicates that the crescendo depicted there rises, then drops a bit, rises again, drops a second time and then takes its final burst to the top. This type of rise was present in more than half of the large crescendos which occurred during the broadcasts.

Further reference to Figure 2 shows that the volume was decreased, for the most part, during the interval when the crescendo was temporarily decreasing in loudness and, further, that the full compression had been completed prior to the last rise. This means that in spite of the fact that the range had been compressed, a compensating factor of increased contrast between the rise and

fall during the crescendo had been introduced which tended to offset to a large extent the loss in volume range.

The method of lowering a diminuendo was exactly similar only reversed in direction. Most of the volume control necessary to lift the softest passage out of the background noise was accomplished in the early part of the diminuendo and was usually accomplished during the time that the orchestra itself was increasing its loudness.

During the early work which led to these later experiments one amusing, and also instructive, situation arose. In this case a musical shift was being prepared. The orchestra in use was small and its volume range did not exceed the range of the equipment then available. It was therefore possible to make the recording without compressing the volume at all. However, the orchestra leader permitted his orchestra to reach the maximum volume at the place in the crescendo corresponding to the point "M" in Figure 2 so that the orchestra had no reserve left for the final burst. Three takes were made under these conditions, the first two being made with no operation of the mixer dial. On the last take, as an experiment, the author reduced the volume 6 db during the early part of the crescendo and increased it back again at the time the final burst should have occurred. When the orchestra leader heard this third take, he remarked, "That is funny. That is better than the band played it."

It will be seen from the foregoing that the full use of this technique requires thought and musical knowledge on the part of the mixer as well as close cooperation between the musical director and the mixer.

"Forget Theories" Says 'odd

(Continued from Page 289)

of his crew. He tells us that he is constantly striving to help every member of the crew become more proficient in his work, and whenever the opportunity for advancement presents itself, Todd is the first to recommend some member at his new for the post.

Few men can honestly say they "preach what they preach," but Arthur Todd can. He left school at the ripe old age of fourteen and ran away from home. He was fortunate enough to find immediate employment in a studio and began serving his apprenticeship, as he calls it, as a cinematographer. In all his twenty years in the industry, he has never turned from the channel of hard work, he has never allowed himself to become self-centered, and above all, he has never allowed any temperament to interfere with his work. Perhaps it is because of this belief in his work as a trade, that today finds Arthur Todd on the top of the heap, unspoiled and still an able craftsman.

BIG NEWS

WITHOUT a doubt Super X Panchromatic Negative is the big news of the year as far as raw film is concerned. Its unprecedented speed...its fine grain...the improved photographic quality cameramen are getting with it under greatly varying working conditions...these factors point to Super X as 1935's major film advance. Eastman Kodak Company, Rochester, N. Y. (J. E. Brulatour, Inc., Distributors, New York, Chicago, Hollywood.)

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Natural-Color Cinematography Today

(Continued from Page 238)

have found, for instance, that projected color is best used on sets, and only sparingly on people, except in dance numbers.

Projected color has been and will of ways be an eye in the hole for the cameraman. When a set is too monotonous or a stage sequence needs an added "kick," projected color is usually the answer.

Contrary to some opinions, this is no newly-discovered technique. Projected color was used quite extensively in all the stage numbers of "The American Venus" in 1925, and in the more recent "King of Jazz" there were many striking effects. Especially memorable in that production was the dance on the drum by Jack Carter in the "Rhapsody in Blue" sequence. The colored light striking his black body and the wing huge grotesque shadows, drew many favorable comments from both press and public.

Another field for projected color is in mystery and horror pictures, where its use is unlimited. In "Doctor X" and "Wax Museum" projected color played an important part and added greatly to the dramatic sequences and effects. Up to the time of "Wax Museum," projected color was restricted somewhat by the limitations of the two-color process but with the new three-color process it opens up a wide range of possible effects. This was well demonstrated in "La Cucaracha," where it was used quite generally on the sets but sparingly on faces—and then only for special dramatic effects. Used indiscriminately on faces it would undoubtedly be bad and interfere with the continuity of the story but properly used, it can be extremely effective.

At this point, it may be well to mention that despite the fact that we use arc lights and, as a rule more and larger units than would be required for comparable monochrome camerawork with larger and heavier cameras and blimps, I have not found that color camerawork hindered production in any way. We can make any normal shot that can be made in black-and-white, our blimps are, perhaps, the quietest in the industry; and we have proven that we can work with the same efficiency as comparable black-and-white units. The late Lowell Sherman, under whose direction "Becky Sharp" was commenced, even paid us the compliment of saying that we were working as fast as he had in his previous production in black-and-white!

The Incolor camera brings with it an entirely new conception of makeup. Hitherto, makeup has concerned itself only indirectly with color. Now it must concern itself, not only with retouching

away imperfections of contour and texture but with maintaining and often enhancing the natural coloring of the complexion as well. Makeup must appear natural in every way if it is to photograph well. It would be perfectly possible to photograph a three-color production without using any makeup at all, but we have found that the best results are had if the players wear enough makeup to soften any imperfections of skin and contour, and to maintain even flesh tones throughout the production. Sunburn tans, and so forth, can cause noticeable variations in ordinary pictures, if not corrected by makeup; you can imagine the result of a player's suddenly getting sunburned in a color film! Our makeup should be extremely light—scarcely more than a powder-base, with only the most natural rouge and lip-makeup in the case of women. None of the players of "Becky Sharp" would have excited any comment had they worn their makeup on the street.

Character makeup must naturally be modified to conform to the same standards of naturalness. The best test of any makeup for three-color pictures is a glance in the mirror if the makeup appears natural in the glass, it will be natural on the screen.

Close cooperation between the Art Director, the Costumer, the Director and the Cinematographer is even more vital in color than in black-and-white. Everything should be planned and executed to play its perfect part in a coordinated whole—and this condition cannot apply if any one of this all-important quartette tries to exhibit individual brilliance at the expense of the others. May I add here that the Cinematographer who has a Director of Rouben Mamoulian's ability, who will not only cooperate, but go out of his way to help the camera crew get the desired results, as he did on "Becky Sharp," is indeed fortunate. I wish to take this means of thanking Mr. Mamoulian and also Robert Edmund Jones for their cooperation.

Technical, through its Color Control Department, under the direction of Mrs. Kolmus, is ready to aid in bringing about this desirable coordination, helping the studio's picture-wise artists to learn what to do, and especially what not to do, in designing for color films. None the less, a potential situation exists which will eventually call for all the diplomacy and character that Directors and Cinematographers can exert. Sooner or later, the day is coming when Cinematographers throughout the industry will be wise indeed if they keep an eye open to the problems and the opportunities that color will surely bring forth.

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Mother Nature Knows Best

(Continued from Page 287)

perform against his sets as they do in Nature's setting.

His current work, "Old Man Rhythm," is not an especially weighty tome. It is a musical dealing with the prevailing scenarists' conception of going-on grid co-ed campus life, after the formula set as standard by George Ade.

The mere fact that musicals have always been photographed in high key was no index to Musurco that he should follow that well-trodden road. Rather, he deliberately set forth to render it in as low a key as possible. The result is extremely interesting. It may, indeed, establish a new precedent in the chapter of musical production. For it is by far done in the lowest key of any musical to this date.

He has lost nothing of the appeal gained by high scintillating scenes so generally employed in works of this type. In their place he has elaborate numbers done in silhouette and semi-silhouette that are superb—with the added merit of being original.

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To a remarkable degree he has inspired on his negative the naturalness and unaffected mannerisms of youth of the college age. In contrast to given types of mechanical chorus evolutions, it is distinctly refreshing and effective.

Musuraca is a conscientious proponent of the cinematographic arts. His devotion to the assignment of hand is exceptionally thorough. With painstaking care he supervises his painting staff as they place exactly the desired depth of shadows on his sets. He uses tones of blue paint for this purpose.

Generally speaking, his quantity of light is much less than commonly utilized.

His complete information pertaining to the media he employs takes him into

close harmonious follow-through with his laboratories. He views his negative, of course, the following morning; he views the print as well. He is witness to the release prints, also—that the full worth of his cinematographic effects may be conveyed to the screen in undiluted measure.

As with all creators of art forms, Musuraca is ever unsatisfied. Always he is striving for results closer to his own standards of perfection. His "best" picture, he says, has not yet been photographed. It probably never will be. For no matter how ample any production may fill contemporary levels of artistic merit, the true artistic heart that is within him will drive him on to still greater achievements.

DEVELOPING A STUDIO SPOT

(Continued from Page 253)

projects into the form of a ring or "doughnut," having high intensity in the edges and relatively low intensity in the center.

The Male-Richardson "Junior Solenopot" is a spotlight of entirely new design, which has been developed to return, in so far as possible, the advantages of both the condenser type and projector type of equipment, while avoiding the faults of these equipments. This new type of spot lamp is schematically represented in Figure 3. The change in the form of condenser lens immediately distinguishes this type of spot lamp. Instead of the conventional plano-convex condenser, a Fresnel type of plano-convex condenser has been designed for the new lamp. This Fresnel type lens is a plano-convex lens approximately 10" in diameter, made of the finest heat-resisting glass, and designed to be of relatively short focus. The lamp is designed for operation with a 2,000 Watt bi-post type Mazda globe. The reflector behind the globe is a spherical mirror whose radius of curvature has been designed to, at all times, concentrate upon the condenser lens the light falling from the rear of the globe, which would otherwise be lost. This lamp, when "spotlighted" to an 8" beam, collects 74% of combined direct and reflected illumination upon the condenser lens. In the "flooded" position when diverged to an angle of 44", combined illumination of 104% is collected. By carefully designing the spherical mirror equipment, the advantage of efficient light collection, characteristic of reflector lamps, has been obtained. By controlling the projection through the Fresnel type lens, the advantage offered by the condenser spot of an excellent distribution of illumination within the beam, is afforded.

To those whose technical training en-

ables them to interpret mathematical data from graphic representation, Figures 4 and 5 are worthy of consideration and study. Since a great deal of motion picture work demands beam divergences of around 18", Figure 4 has shown the plotting of distribution of the three typical motion picture lamps. The solid line "A" shows the distribution of the new "Junior Solenopot." The broken line "B" shows the distribution of a typical condenser spot as schematically represented in Figure 1. The dotted line "C" indicates the foot-candle distribution of an 18" reflector spot equipped with a glass parabolic mirror and with a spill ring. The curves in Figures 4 and 5 are all directly comparable, all readings having been made from the same 2,000 Watt G-88 C13 bi-post Mazda globe, at its rated voltage of 120, the Solenopot and the condenser spot both being provided with suitable spherical mirrors for effectively utilizing the light from the rear of the filament.

The curves reveal both the advantages and the disadvantages of the various types of equipment. Curve "B" indicates that the distribution of illumination from a condenser spot is quite satisfactory, but its low intensity indicates inefficiency. The M-shaped curve "C," showing the distribution of illumination from a parabolic mirrored spot indicates graphically the intensity of illumination at the edges of the beam as compared with the intensity at the center. As a collector of illumination, the parabolic mirror is efficient, but it does not put the light where the Cinematographer requires it. The Junior Solenopot, as indicated by curve "A," shows an almost ideal distribution, with the high intensity in the center, and with edges that taper to low intensity and permit the overlapping of illuminated areas without

building up areas of higher illumination in the overlaps.

Figure 5 gives additional information regarding the distribution of the Junior Solarspot, all measurements being comparable with those shown in Figure 4. In this graph are shown typical distributions for divergences of 10, 18, 24, 32 and 44 degrees. The development of this new equipment extends its range for all uses within its illuminating capacity where divergences are required from an 8" narrow spot-beam to a 44" flood-beam.

The Junior Solarspot is particularly adapted to beam-control by means of an adjustable iris-diaphragm, as shown in the photograph, Figure 6. By controlling the diaphragm opening in combination with the focal adjustments, a wide range of intensity can be obtained from this equipment without altering the divergence angle. We anticipate that this lamp will be very useful in the fine modelling of clausaps when the iris diaphragm control is applied as it provides a means of adjusting light intensity without altering the spectrum characteristic of the projected illumination as is the case when dimmers are used, or when diffusing mediums are used to restrict the light intensity. As color photography begins to hold a more important place in the motion picture business, control by means of the iris diaphragm will be found particularly advantageous due to the fact, already mentioned, that the color-value of the illuminant is not altered.

Co-ordinating Makeup with Film

(Continued from Page 250)

Experience has proven this to be the case. The introduction of the Super Sensitive emulsions, four years ago, brought no need for changing the color of the makeup, though the changed speed of the film necessitated a change in the shade of the makeup used to produce any given effect. The same is true of the new Super-X film: its color-balance may have been altered sufficiently to be noticeable to the research laboratory, but not enough to disturb the relation between the color-vision of the panchromatic type emulsion and panchromatic makeup. The increased overall speed of the new film, however, should call for a corresponding change in the shade of makeup used.

Now we have long known that a man who works in a low key—who uses relatively little light—will get the best results if his players are made up in a relatively light shade, while a man who works in a high key, using a greater intensity of light, will be better pleased if his cast wear darker makeups. In the

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some way, a blonde woman would be made up a bit darker than a brunette—not only to furnish a more pleasing contrast between hair and skin, but to offset the added light frequently needed to balance the "hotter" back-lighting on the blonde hair.

With the earlier types of Panchromatic film, the basic makeup for the average actress was a No. 24, with the male players wearing No. 26, two shades darker. When Super Sensitive emulsions were introduced, we found that the increased speed was tantamount to a considerable increase in the key of the lighting; therefore, the basic makeup for the average actress became the No. 26, with the men darkened to No. 28. The actual increase in the film's speed was over 200%. Therefore, since the makers state that Super-X film is nearly 100% faster than SuperSensitive, we might logically expect that the new emulsion would require makeup one shade darker. This is the case, and where an actress might be accustomed to wearing a No. 26 makeup for SuperSensitive, the change to Super-X would necessitate a No. 27.

For DuPont "Superior" film, the basic makeup for women is usually a No. 25, with a No. 27 normal for men. In some studios, however, the Makeup Artists have found it unnecessary to differentiate between Eastman SuperSensitive and DuPont Superior except in the application of rouge, using a light rouge for the Eastman film, and a darker shade for the DuPont.

Agfa "SuperPan," probably because of its extreme red-sensitivity, takes the same makeup as used for Eastman "Super-X."

These observations, however, are necessarily generalized, and cannot apply to specific cases. Many factors, including the texture and absorptive character of the player's complexion, the Cinematographer's style of lighting, and the processing in the film-laboratory, must be reckoned with in solving specific problems of makeup.



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AMATEUR MOVIES

this issue

Charles Herbert gives the Magic
Carpet Formula

How to Make a Wipe-off Gadget


Putting Sound in Silent 16mm Film

Shooting Pictures at San Diego
Fair

Formula and Method of Home
Reversal

... and other features

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AMATEUR MOVIE SECTION

Contents . . .

DOCUMENTARY Picture of the Old Farm by Charles W. Herbert, A.S.C.	304
HOME Reversal Development by Charles E. Keenl	306
PUTTING Sound on Silent 16mm by J. Lloyd Thompson	308
GADGET for Making Wipes by Arthur Wolff	309
EXPOSING at the Exposition by Walter Blanchard	310
TINY Footsteps Thru the Day by George Andrews	311
LEARN About Technicolor from "Becky Sharp" by Karl Hale	312
WHEELS of Industry	314

Next Month . . .

◆ We have a gadget to offer you next month that is one of the most interesting pieces of equipment conceived by an amateur and built by him at the price of only a few dollars. We know that many readers will find a great deal to interest them in this gadget. It was conceived by an amateur and sent us in our gadget and trick contest.

MAGIC carpet cameramen receive a great variety of assignments—some are far away, others are just around the corner of everyday life, some are hard, others easy, one requires a week's work while another takes six, but the general order remains the same: "Make the picture tell the story."

When you go out to cover a commonplace subject that is the time you have to scratch below the surface to get the material needed for an outstanding reel. Many seemingly uninteresting spots on this old globe will yield a harvest if you use a fine tooth comb and all the resources you have stored up from experience in more fertile fields.

Find yourself dropped down on the Island of Bali, among the fisher folk of Zyder Zee, in Tinbucktaa or Paramanba and there is a picture at every turn of the trail. You will keep the film buzzing through your camera and probably end up short of film with many interesting shots not covered. But set your camera up on the quiet countryside of England or the United States and you will have to think twice before shooting.

This summer if you have the privilege of visiting or living in the country, rural life is a good subject to try out—an ordinary subject which can be made into an interesting reel with a little thought and effort.

There are always a few fundamental rules to follow so it is best to acknowledge the difficulty of your immediate task and tackle the job accordingly. First as your subject matter is commonplace, you must put it over with special emphasis on camera treatment.

A tree is a tree after all, but if you can find one with a little individuality, that is knotted and scarred, that is the one you want to use for a countryside scene. Set it off with a cloud and the interest heightens. Trees give character to a landscape so keep your eyes open for the ones that are typical and representative of the country you are working in.

Houses are common sights, but give another opportunity for characteristic atmosphere of your subject. Many houses are built on the same style and it might seem that any one would do. But don't content yourself with a shot that might be duplicated in a hundred different places, keep looking and poke your picture eye around the corner until you find just the right set-up. The house should not be shown in full front view but rather at a little side angle so that the front and part of one side are seen. You must also be far enough away so that some local foreground can be included in the scene. And above all, shoot so that your scene will not look like a real estate photograph.

If there is a road leading from the house, a little natural action can be arranged to make your scene alive. Otherwise, a section of a fence or a bit of a brook in the foreground provides a spot for life such as a brood of ducks in the water or several cows grazing just beyond the fence.

Such scenes as these can go to make up the introduction of your story. Many details can be added to extend the sequence—closeup of birds in a tree, a bee buzzing around a flower, a grasshopper on a blade of grass, a squirrel in a tree, and scenes of artistically lighted bushes against a cloud-flecked sky. Most shots of this nature will require a low camera position as it is a safe rule to follow that flowers, small animals and insects are shown to the best advantage if photographed with the camera hori-



Documentary

zontal and not looking down. This rule is one of the "don'ts" that should be permanently fixed in the mind of a camera enthusiast. Rarely would you make a shot of a human being looking down at him, likewise, you should not shoot animals that way.

A baby legged with very short legs provides the camera position and should be a part of your regular everyday working equipment. You will have to get in awkward positions, yourself, to make these shots but they are well worth the effort.

With the foundation for an introduction laid down with general views and augmented with sufficient footage of intimate closeups, your next move should be in the farm yard, hunting for the bits of life that make the wheels of country life go around. Such a film as this needs scenes that portray the soul of your subject. All the little chores which go to provide the necessities on the farm must be included, so, once inside, cast your camera eye around and as soon as it rests on some bit of action, set up and record it. It is safe to say that no subject will provide more different kinds of work and angles from early morning till late at night than right here on the farm within easy reach.

Out in the shade of a backyard tree Grandpa can be found churning butter. Don't make a stereotyped picture of him but spot the churn in a mottled shade of leaves from a tree so as to create a pattern of lights and shadows on your subject. Get a full closeup of his jovial face. If any children are sitting around, arrange them so that you can make a closeup cut in shot of them watching the operation expectantly. And when the butter is churned and you have made scenes of Grandpa taking it out, a good human interest shot can be made of the kids drinking



Picture of the Old Farm

by
Charles W. Herbert, A.S.C.

buttermilk, not forgetting the chickens trying to sneak the particles of butter that drop to the ground.

While Grandma is patting the butter, a very low camera position will give you a novel angle. Her hands and the butter in the close foreground appear distorted and the action is emphasized while her head shows up smaller in the background. Such a shot does not have any particular significance but it does add variety which is always an asset and distinguishes your work.

Keeping alert, you can be on the job as the rural postman brings the mail. This gives an opportunity to work in a shot of the gate and yard and a short panaram in following him will show a section of the country road. If flowers are on the arch above the gate or elsewhere, shoot the scene from an angle that shows them. Then flash in a closeup for effect.

It's easy to find a natural shot of children of the house while they are absorbed in some form of study. It usually takes a little patience to get these scenes but they are always valuable to your story. Watch for good lighting ef-

fects, especially back lighting aided by a reflector, and try to shoot as they smile or make some natural gesture. The boys of the farm can't be left out and they will probably be found doing some chore which they consider a man's work—driving in the horses, hitching up the team or bringing in a load of hay.

To record scenes representative of real farm life, you must go afield where the men are working. Always harvest time gives more opportunity for real labor. Even with modern machinery there is still much work for man and beast. In covering this sequence, go in for action scenes primarily—especially detailed moving parts of the harvesting machines with their various eccentric movements. Good human interest shots that show head closeups with sweat on the brow and closeups as a man grabs a drink in a spare moment can be added.

Go to the cow shed while the hired man is milking. Here is where you can get many different scenes to work into one complete interesting sequence. Start off with scenes of driving in the cows, selecting a setting that has lights and shadows along a lane or field. Pick up a smooth closeup shot of a spotted cow meandering along. Be inside the shed as they come in the yard and enter the door just in front of the camera. Select a spot in the shed where some beam of light comes in from the windows. You may have to remove a section of planks to get this effect. Make a closeup of the man milking, a closeup of his hands and follow down to the stream of milk in the pail. By all means try to get a scene as the cow scratches her tail and hits the man in the face. If she licks at a fly and knocks over the pail of milk, so much the better—for your picture. Enlist the service of the barnyard cat to sit by with an envious eye on the spattering milk. With a good head closeup of "Sissie" as she chews her cud, your sequence is complete. Watch the light throughout this sequence and try to use a beam of light to give the impression of an interior and at the same time to illuminate your subject sufficiently to record details in the foreground leaving the background dark.

A closeup of the dinner bell swinging away its call to the far corners of the farm will start off a series of good natural scenes that tell the story in a convincing way. Make

(Continued on Page 318)

Home Reversal Development of Movie Film

by
Charles E. Keevil

THERE is an increasing number of amateur movie enthusiasts who are becoming interested in doing their own developing rather than sending their films in to a commercial laboratory. In the past, these amateurs have been limited to the negative-positive system because there was little information available on the reversal method of development which is used by the film manufacturers in processing their product. However, making a positive out of the film used in the camera, by reversal development is not at all difficult and with the instructions following anyone who likes to develop his own pictures can easily master the process.

At the start it is well to understand just what reversal development is and the two basic methods of accomplishing it. In reversing, the film is first developed into a negative, then the negative image is bleached out, or dissolved away, instead of having the remaining silver bromide dissolved out in hypo as with ordinary negative development. When the negative image has been dissolved away, the silver bromide remaining in the emulsion is in the form of a positive image, so it is exposed to light, or flashed, and put back in the developer which develops up the positive required for projection. It sounds quite simple and it isn't hard to do since the various operations are thoroughly understood.

There are two ways of carrying through this reversal development, the total flash and the printing methods, which the amateur must not confuse in his mind. In the first or total flash method, ALL of the silver bromide in the emulsion is used in the negative and positive images, so fixing in hypo is not required. In the second, or printing method, all the silver bromide is NOT used up in the two images so fixing is required to remove that left in the emulsion. Since the total flash method is the simplest for the beginner, it is recommended that it be mastered before going on to the printing method which has advantages that will be explained later.

Before going on to instructions for reversing with the two systems, a word should be said as to film and equipment to be used. Since the manufacturers of reversal film charge for the finishing with the sale of the film, there can be no object in the amateur reversing that type of film. Negative film nowdays is nearly all made with a non-halation coating that is more or less objectionable in a positive. However, very good results, except for color rendering can be obtained on ordinary positive film stock which can be readily obtained in both 16mm and 8mm double perforated for splitting into two 8mm films. The following remarks are therefore confined to positive stock which has the advantages of low cost and the possibility of being handled in a bright red light so the amateur can easily see what he is doing.

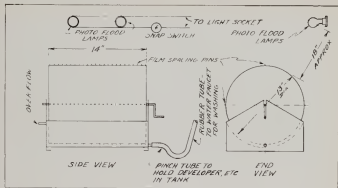
The equipment needed is quite simple and can easily be made by most amateurs. A developing drum similar to that shown in the accompanying illustration is the first requirement and should be a solid rather than skeleton one if the printing type of reversal is to be tried, although total flashing can be done on the open type. A round

bottom tank for the solutions is required, the drum being mounted so the film will revolve through the solutions as the drum is turned. Many designs of drums and tanks have been published so no repetition will be made here, the amateur should build one to meet his own needs as to size, film capacity and material. Wood is the best material but hard to make watertight. Sheet metal with soldered joints will serve satisfactorily if the whole drum and tank is well protected by a good enamel such as Black Waterproof or the special photographic enamel. The tank should be arranged with drains so the solutions can be changed quickly and so running water can be introduced for washing the film. A skeleton type drum for drying the film should be mounted so the film can be wound easily from the developing drum onto the drying drum. Lights for flashing the film, which will be described under the various methods, and a red dark room lamp complete the larger items of equipment.

TOTAL FLASH METHOD

As the positive image in this method of reversal is made from ALL the silver bromide left in the emulsion after the negative image is dissolved away, it is important that enough be removed with the negative image so that the positive will not be too dense for projection. This means a very full exposure in the camera and with positive stock two stops longer than for regular panchromatic reversal film will be about right. Due to its lack of color sensitivity, under light conditions deficient in blue, positive stock will require even slightly more exposure. A good photo-electric cell exposure meter is a big aid in securing even exposure throughout the roll of film which is desirable for all reversing.

When ready to develop the roll of film, it is wound on the drum, emulsion side out, and the ends fastened with rubber bands to take up the slack as the film expands when wet. The developer is poured in the tank and the drum revolved through it until development is complete. When complete, the emulsion side of the film should appear a dense black while the negative image should show through the back of the film quite strongly. This appearance of the film would indicate a strong over-development for a negative, but it is necessary in this system of reversal to force the negative image through the emulsion or the positive will be too dense for projection. With the following



developer formula, it is almost impossible to overdevelop if the exposure has been as indicated:

Metal	22 grains
Hydroquinone	85 grains
Sodium Sulphite	1.25 oz
Potassium Carbonate	75 oz
Potassium Bromide	8 grains
Water	1 quart

This developer works best around 68 or 70 degrees and should develop a properly exposed positive film in around eight minutes although longer or shorter time can be used to get the desired appearance of the negative image.

When the negative image is fully developed, the film is rinsed in water and then bleached in the following bath:

Water	1 quart
Potassium Bichromate	77 grains
Sulphuric Acid (concentrated)	1 1/2 drams

Revolve the drum through this bleach until all traces of the negative image are dissolved away. This should not be hurried but should be done thoroughly. The bleach will leave a stain on the film which must be removed in the following clearing bath—raise the film in water, then clear in:

Water	1 quart
Sodium Sulphite	1/2 oz

Revolve the film through the clearing bath for several minutes as this alkaline bath will also neutralize the acid left in the emulsion from the bleach—this is quite important as any acid in the emulsion will prevent development of the positive image. The white lights can be turned on when the film is put in the clearing bath and it will be easy to see when the stain is all cleared from the film. The white lights meant here are the general illumination ones in the room—not the photoflood ones shown in the illustration which are used only with the printing method of reversal. At this stage of the development the positive image can be easily seen by transmitted light.

After clearing, give the film a thorough washing, re-

volve the drum through clear water which is running into the tank and out the overflow. Ten minutes should be enough and it can be done in white light as it is desired to develop up all the remaining silver bromide in the emulsion.

After washing, return the same developer to the tank and re-develop the film which will now have the positive image on it. In order to be sure that all the silver bromide is reduced to silver, an ordinary lamp on an extension cord can be brought up close to the drum while development is progressing. This prevents any uneven exposure the film may have gotten during the clearing and washing operations. On a skeleton type drum, this is quite important, otherwise bar marks will show where the film got heavier exposure (from both sides) between the bars.

When fully developed, the film is again washed about ten minutes and then wound on to the drying drum, being squeezed through a chamois skin or viscose sponge. Wet the chamois or sponge then wring out as dry as possible and run the wet film through two pieces with sufficient pressure to wipe off all surface moisture but not hard enough to damage the emulsion. In cold weather this presents no difficulty, but in warm weather the emulsion will be too soft unless it is hardened. To harden the film, it is revolved through the following hardening bath for three or four minutes after the first development and before the bleach.

Water	1 quart
Potassium Chrome Alum	1 oz

Film that has been squeezed properly will dry very rapidly and without water marks even though the drying drum is not revolved while it is drying.

Very good positives can be made by the foregoing method if there is sufficient light for proper exposure in the camera—the heavy exposure needed being its only limitation. It is simple to carry through as judgment is not called on at any time except in determining the length of the first development—all other operations can not be overdone, the only danger being in slighting them! All operations except possibly the first development, should be carried to com-

(Continued on Page 110)



Putting Sound on Silent

THE next big step in amateur movies will probably be sound. It doesn't take much of a prophet to guess that, but it is causing a lot of questions to be asked. People are wanting to know what they are going to do with their old silent subjects, how they are going to afford a sound projector, whether they are going to be able to make their own sound pictures, how can they get duplications made, and a thousand and one other questions.

For the serious amateur, the new 16mm sound cameras on the market will record the synchronized sound he will want to make. However, there are going to be a number of problems for him to overcome. He is going to have to learn something about sound recording just like he had to learn the fundamentals of photography before he could make good pictures. If he doesn't know these fundamentals his sound will be just as bad as his pictures are when he doesn't follow fundamentals. There is still the problem of making duplicates of 16mm sound films which has not yet been successfully solved. The duplicates which have been offered so far have been made by the duplicate negative process. This is all right for the picture, but a lot of the sound quality is likely to be lost by using two processes. By using the reversal method of making duplicates of sound films the background noise can be kept down, more of the fine lines preserved, there will be less trouble from slippage (very serious in 16mm) and the whole result will be more satisfactory. In order to make prints by this method it is necessary to use an optical printer for the picture, and a specially built sound printer for the sound track. This is necessary to get the track, and the emulsion on the right side. There is, however, a new sound printer on the market now which claims to have solved this problem. So much for 16mm sound which the amateur himself will make.

Every picture we see in the theatre is sound. Not all synchronized sound by any means, and a great many of them are made silent with the sound recorded later. Just as the theatre has added sound to all pictures the amateur is going to want to add sound to his silent films, and neces-

16mm Film

by

J. Lloyd Thompson

Laboratory Supervisor, The CALVIN CO.

Authorized Agfa Ansco Reversal Laboratory

identally he is probably going to find that it will be to his advantage to make a lot of his pictures silent, and add sound after they are all edited. It may be a ghost voice, music, or a mixture of the two. It is possible now to buy equipment to do this with, but most amateurs, and probably a lot of the industrial users are going to find it to their advantage to have a regular commercial laboratory do the work. There are several labs now doing this work, but since I am most familiar with our own work most of the discussion of this problem will be confined as to how we do it.

The picture is first made, and completely edited. It is usually made 24 frames per second although we have recorded sound on pictures made at 16 frames per second which projected very nicely without being noticeably fast. We then make a duplicate, and using the duplicate we project it in a sound projector and write the script, and decide on the music, and any sound effects we want to use. It is very essential that the script be timed correctly, and it is important to keep it rather short as too many words will cause the announcer to rush with the result that he will be hard to understand. These two points should

(Continued on Page 167)

Gadget for Making Wipes

by
Arthur Wolff

THE article written by Lynn Dunn, A.S.C., about a year ago on "Tricks of the Optical Printer" inspired me to experiment in order to find an easy way for an amateur with merely his camera to depend upon, to produce pictures with similar effects. I wanted it to be something small and inexpensive that could be attached to the camera. The result was the gadget shown on this page which was built at a total cost of 10c for the mirror.

This gadget is to be used for scenes, not for titles. You will understand the why of this as I explain the use of the gadget and what happens photographically when you photograph through the mirror.

This "Wipe" gadget is nothing but a small cardboard box, which has a right-angled triangular shape on top and bottom and three rectangular sides. See Fig. 1. And by the way Fig. 1 is reproduced in actual size.

One side is provided with a vertical opening, in which a mirror about 4" long x 1 1/2" high is inserted (Fig. 2). The box is fastened to the camera door with a strong rubber band slipped over the box and each loop over the view finder from both sides of the camera (Figs. 6 and 7). The mirror is then inserted and pushed forward until it touches the left front edge of the lens sunshade and reflects into the lens the scene that is to the right (45°) of the camera. While this scene is photographed, I pull the mirror back very slowly, obtaining a wipe-off and wipe-on with one exposure, as the lens will gradually pick up the front view while the side view, by the same operation, disappears.

The mirror view (side view) will appear right side left on the screen. That is why we say this cannot be used for

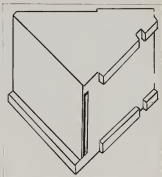


Fig. 1

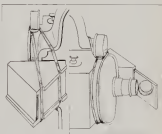


Fig. 6

Fig. 7

titles. It is a very fine effect for introducing characters. A number of persons can be filmed using this gadget without

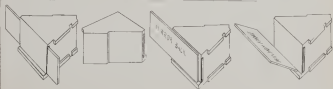
(Continued on Page 121)

Fig. 2

Fig. 3

Fig. 4

Fig. 5





Exposing at the Exposition

by
Walter Blanchard

IF YOU'RE going to the San Diego Exposition—and who isn't?—of course the family cinabox will be one of the party. But they're having a lot of exposition down there in San Diego—acres and acres of it—and unless you plan your filming, you're likely to run out of film before you're nearly ready to stagger (not run!) out of the exposition grounds. The picture-possibilities of the place are just about endless: if you have the time and the film, you'll find subjects about which you can create any number of individual picture-stories, and no matter what your favorite type of film-subject is, you'll find it at the fair. Where else could your lens rove from landscapes of stately beauty to nudists, more or less wild Indians, and Hollywood film-stars in less time than it takes to tell about it?

Seeing the exposition in itself is no one-day job, seeing it and filming it properly in a single session, still less. The logical thing, therefore, is to make two visits (that should please the fair-managers!), surveying the field and seeing the show the first time, and filming it the next. But if you can't do it that way, here is an outline for a pretty comprehensive exposition-film.

MAIN TITLE

¡VAMOS AL FERIA!

(This can be very effective if double-exposed over a

shot of the bridge just within the west entrance with the fair buildings in the background. The title could also be printed on a photograph of this view, avoiding double-exposure.)

Scene 1 Long-shot looking east on drive from west entrance

Scene 2 Long-shot over side of bridge, panning to view of the City

Scene 3 Long-shot over north side of bridge: these two shots contrast the semi-tropical scenery of Scene 2 with the "Pacific-Northwest" landscape of this scene

Scene 4 Medium long-shot, looking east through first archway (The reverse-angle on this arch is also very effective.)

Scene 5 Panorama of the exposition-grounds from the California Tower

Scene 6 Long-shot looking south along the Plaza del Pacifico

Scene 7 Long shot of the huge pansy-bed in this Plaza, follow with closer shots *ad lib* of the flowers

Scene 8 Long-shot of the great Spreckels Organ at the foot of the Plaza

Scene 9 Panorama of the Plaza de America: this will include long-shots of many of the most unusual buildings in the fair: the Palace of Water, Palace of Electricity, Ford Building, etc. each of which deserves individual closer shots

Scene 10 Closer shots of the Plaza de Aguas Con-tantes (in front of the Ford Building) and the famous singing fountain

Scene 11 Mondays only: a sequence made inside the Motion Picture Hall of Fame, showing the making of actual motion pictures. On Mondays, special preference is given amateur filers, the visiting stars cooperating generously, and you have every opportunity of making movies in a real studio

Scene 12 Long-shot, looking east along the Avenida de los Palacios from the Plaza del Pacifico

Scene 13 Close-shot of the entrance to "Gold Gulch"

Scene 14 Closer shots *ad lib* in "Gold Gulch": this offers excellent material, for it is a 22-acre reproduction of a mining-town of the days of '49

Scene 15 Long-shot of the "Nudist Camp" from the vantage-point in "Gold Gulch": Let your conscience be your guide as to making a complete sequence among the nudists. Cameras, we understand, are not welcome there, however

Scene 16 Long-shot in the Spanish Village, which is north of Gold Gulch across the Avenida de los Palacios. An excellent sequence in color can be made here

Scene 17 Telephoto sequence in the bull-fight arena. You can get every feature of a genuine Spanish bull-fight here—except the blood and the horses, plus some very amusing action. Don't overlook the band

Scene 18 A short sequence of the "Days of Saladin" will be another interesting bit of color, if you wish it

Scene 19 Close shots in the Midget Village

Scene 20 A "condid camera" sequence in the Zocalo, or Midway. Close angle-shots of the barkers and their exhibits—"Crime Doesn't Pay," "Humo-Tune," etc.; candid telephoto shots of the crowds, and so on, will make a very amusing sequence. This is a point at which to try montage, or rhythmic cutting for fast tempo

(Continued on Page 314)

Tiny Footsteps Thru the Day

by
George Andrews



THIS script deals with the everyday footsteps of your baby. It shows what mother has to do every day in her life to guide those tiny feet in the right direction. The time is any day in the week. The place is your home. The characters are mother and the heir apparent: your baby. This story will prove invaluable to you as the years fly past and those tiny feet grow from a size 3 to 9. In this story, nothing is photographed except the lower half of the baby's body. Only in the last scene is this rule broken. The continuity will designate when to take the full figure of the baby.

Scene 1 CLOSEUP of baby's feet dancing happily. He is standing in the crib. Mother approaches, and lifts the baby from the crib. Little sleeper feet toddle off beside Mother.

Scene 2 CLOSEUP of little feet stepping beside high-chair. Feet are lifted out of scene by Mother.

Scene 3 CLOSEUP of little feet swinging back and forth in the high-chair. Occasionally a piece of food is seen dropping past the camera to the floor.

Scene 4 CLOSEUP Little feet are lifted out of high-chair and placed on the floor, then toddle out of scene beside Mother's feet.

Scene 5 CLOSEUP of the slippers dropping on the floor. Little feet are lifted out of them. Feet are lifted up and set on Mother's knee.

Scene 6 CLOSEUP Tiny panties are seen, being slipped on over the feet, then socks and shoes, and the baby is again set on the floor. The tiny feet toddle away, this time without Mother.

Scene 7 CLOSEUP of little feet stepping beside the screen door. The door is seen being pushed open by baby.

Scene 8 CLOSEUP of Mother's feet. They turn and walk quickly out of scene.

Scene 9 CLOSEUP of baby's feet. Mother's feet come into the scene and the two pair of feet walk out of the door together.

Scene 10 CLOSEUP Shot of play pen. Mother and baby's feet come into the scene. They stop before play pen. Baby's feet are lifted out of scene, then reappear on the inside of the play pen. Mother's feet turn and walk out of the scene.

Scene 11 CLOSEUP of toys being thrown out of the pen. Little feet stamp up and down angrily.

Scene 12 CLOSEUP of Mother's feet as they walk out of scene.

Scene 13 CLOSEUP of baby's feet standing in a puddle on the play pen floor. Mother's feet come into scene. Her hand reaches down and feels the baby's panties. They are wet. Mother gives the baby a light tap on the legs. Baby is lifted out of the pen and put down on the other side. They walk out of scene together.

Scene 14 CLOSEUP of a little potty chair. Mother and baby's feet come into the scene, and baby is seated on the potty chair. Mother's feet turn and leave the scene.

Scene 15 CLOSEUP of baby's feet kicking angrily against the potty chair. Mother's feet come into the scene, and clean panties are seen being slipped over the baby's feet. The two pairs of feet leave the scene together.

Scene 16 SAME AS SCENE TWO EXCEPT THAT THE BABY'S FEET ARE NOT IN SLIPPERS.

Scene 17 SAME AS SCENE THREE.

Scene 18 CLOSEUP, SAME AS SCENE FOUR, except that little feet toddle away alone.

Scene 19 CLOSEUP of the base of an ash tray stand. Little feet walk into scene and stop before ash stand. The ash tray is thrown to the floor. The glass tray breaks; cigarette stubs and ashes are strewn over the floor.

Scene 20 CLOSEUP of Mother's feet. They turn from the sink where they are standing, and hurry out of the scene.

Scene 21 CLOSEUP of baby's feet. The baby's hand reaches down to pick up one of the stubs. Mother's hand comes into the scene and slaps the baby's hand. Mother's hands are shown picking up the pieces of glass, as the baby toddles away.

Scene 22 CLOSEUP of baby's feet coming into the kitchen. He stands before a chair, and pushes it to a cupboard. Baby's feet climb upon chair, then stand on tip-toe. Cookie crumbs are seen dropping around the baby's feet onto the chair, then cookie can drops to the floor with a crash.

Continued on Page 123



Learn About Shooting Color from "Becky Sharp"

by
Karl Hale

THE first full length feature made in Technicolor was naturally watched with a great deal of interest by the entire motion picture industry. This was perhaps mostly to determine the trend of color in future pictures

Technically there is a great deal to learn from "Becky Sharp," this first full-length color picture made by Pioneer Pictures and released by R.K.O. It is evident that the art directors and color directors of that picture discovered early in the making of the production that it was very dangerous to the story value to inject any of the primary colors.

The picture being laid in the time of Napoleon and the scene being England it is only natural that soldiers with the red coats of that time will be a part of the cast.

Up until the entry of the first red coat there is something very pleasant, almost soothingly surprising in the colors. They are in pastels and greys. The first entry of a red coat pulls your eye to that coat and it adheres to it.

Another illustration of the power of red in a picture is one scene where Becky Sharp and one of the men are sitting in the foreground. Back of them is a vase with red roses. Your eye is constantly pulled away from the people to the flowers.

There is another scene where they have dressed Becky in blue close to primary, or so it seemed. In this scene she is with one of the soldiers in a red coat. The interests are constantly clashing. Your eyes are pulled from one character to the other depending upon movement.

The amateur is prone to look for reds and blues and primary colors when shooting the new Kodachrome or Dufay color. Try one roll away from those heavy colors. Go more into the lighter shades into the pastels and see how pleasing your color pictures will be. If you go for your outstanding primary colors you will have nothing but color to look at and the rest of the picture will not mean anything. Right now many are picturing just those types of subjects, but as time goes on and you tire of just looking at color and will want your color pictures to mean something you will realize that you were merely proving to yourself that the manufacturer was right when he said his film would photograph color.

In the 1934 Amateur Contest the film which won the Kodachrome prize contained all the softer shades of colors. Especially the outdoor scenes had the soft fall colors of the fading plant life, the ripening grain, etc. The people were not dressed in the harsh bright colors, but in the colors they naturally wear.

It would seem from some of the reports reaching us that it is safer in shooting color to lean a little toward over-exposure, more than under-exposure. It is the claim that under-exposure darkens the scene, bringing the reds and blues into more prominence.

Too much color will tire one very quickly. We had occasion to look at many demonstration reels. The longer those reels were the more bothersome they became. This was not due to any fault of the color itself, or to the way in which the film reproduced that color, but because there was too much color, too many brilliant colors, there was too much clashing of eye interest.

What you learned about composition in black and white will not mean much in color filming if you do not watch the placement of your colors. Color itself can throw your composition all awry. It will make its own composition in spite of you.

It seems as though it would be best to lead up into the heavier colors slowly. Attempt the softer shades, learn the value of color and especially the placement values; otherwise you are merely going to have a hodge podge of color without any central interest.

LENGTH 100 FEET
(30.48 meters)

BROKEN.



WIDTH 16 MM

CINÉ-KODAK KODACHROME SAFETY FILM

EASTMAN
KODAK
TRADE MARK

FULL- COLOR MOVIES

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**Truly, black-and-white
comes to life in this
amazing new color film**

"Shoot" Kodachrome the Regular Way
...with any 16 mm. camera (100-foot)...with any lens, including wide angle and telephoto...without a filter for ordinary shots...exposing at but one diaphragm "stop" larger outdoors than required for Ciné-kodak "Pan"!

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IF you haven't seen your first Kodachrome show, you've missed the biggest thing that ever happened in the world of home movies.

It's black-and-white come to life! Kodachrome Film brings the full, true beauty of nature to your screen—eyes, lips, cheeks... clouds, sky, and water.

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WHEELS OF INDUSTRY

Beginning winners to the superlative character of the new machine is the fact that provision is made for the operation of two film projectors with the necessary changeover controls. Changeover is made in the sound and picture simultaneously, by a single control. A control is provided for the correction of high and low line voltages, and the indication of the correct setting is observed on a special voltmeter.

There has been provided a sound volume control, a microphone volume control, a tone control, and a microphone jack. The regular Bell & Howell arrangement of "AC-DC" operation has been retained and all plugs and receptacles have been so arranged that only correct connection is possible. All tubes and cables are mechanically and electrically shielded and consequently are protected from damage and from electrostatic disturbances.

The entire 1000-watt outfit is housed in two carrying cases, one weighing approximately 55 pounds and the second approximately 105 pounds.

Loce Dafay Color

• In their announcement of Dafay Film, the E. Leitz Co. stated there were 300 natural color exposures. This should have read 30. Merely a typographical error of 270 colors.

Magull Catalog

• Magull Bros. announces a new catalog of substandard film releases. It is the 5th edition of this work, which will be sent free upon request to Magull Bros.

Accessory Co. Moves

• Motion Picture Screen & Accessories Co. formerly at 49 West 24th St., New York City, have moved to 520 West 26th St. This company manufactures and markets the Brite-lite Truvision Portable Projection Screen.

New B. & H. Sound Projector

• Bell & Howell Company announces a 1000-watt 16mm sound-on-film talking motion picture projector for use especially in large auditoriums with audience capacities of 2000 and more persons.

The picture-projecting component of the new Filmasound is, fundamentally, the silent 1000-watt Filmaudion projector, which shows most effective pictures up to 16 feet in width. It was one of these 1000-watt silent 16mm machines that was used recently for presenting the motion picture accompaniment of a lecture given under the auspices of the National Geographic Society in Constitution Hall, Washington, D. C., which auditorium seats 4000 people. In this particular case, the picture size was increased to 22 feet.

Because of the size of the auditoriums in which the new sound picture projector is to be used, a separate-unit high-fidelity amplifier of high-power output is employed. This will fill any average-sized theatre or auditorium.

Bee Bee Distance Meter

• Burleigh Brooks announces a new distance meter under the brand name of Bee Bee for use with both still and motion pictures. It has a long optical base of approximately 4 inches which it is claimed insures twice the accuracy of one half so long. The medium which actuates the meter consists of semi-transparent gilded dividing mirrors which produce 2 images of the subject in the optical field. As one glances through the eyepiece, if the meter is not in focus one sees two images of the subject, one sharply defined, the other a bit vague—within a luminous circle. This is brought about by the fact that the light from the subjects is refracted or split. As the dial is rotated the 2 separate images of your subject are superimposed. When the point of exact coincidence is reached, the distance is read off on the dial. The mirrors form an integral part of the mechanism, can be cleaned as they are not surface frosted and being firmly imbedded in metal will not get out of adjustment.

The New 16mm PANCHROMATIC NEGATIVES

(Eastman, Agfa, Dupont)

will surprise you with their fine quality, their beautiful tones and graceful reproductions. If you have them develop, you'll be the

DUNNING GRAINLESS METHOD
DUNNING PROCESS COMPANY
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HOME REVERSAL DEVELOPMENT

(Continued from Page 207)

plethum—as far as they will go—to judging when to stop is reduced to being sure to get enough. Spotty or uneven positives usually mean that all the acid has not been removed from the emulsion (too short a time in the clearing bath and wash water) or uneven flashing exposure not wiped out by bringing a lamp up close to the film during the second development.

PRINTING METHOD

This method has the big advantage that it requires only the same camera exposure as for regular panchromatic reversal film except in light deficient in blue—then a slight increase in exposure is needed to make up for the lack of color sensitivity of positive stock. However, for best results, the exposures of the various scenes must be more nearly uniform, so a good exposure meter should be used if one can possibly be obtained.

In the printing method of reversing, only a normal negative image is desired, hence the camera exposure can be much less than in the former method. With the developer mentioned before and ex-

posure the same as regular panchromatic reversal, two minutes is about the right development time at 65 degrees. The film is then put into an acid stop bath of

Water	1 quart
25% Acetic Acid	1 oz.

In warm weather it is well to add one ounce of Potassium Chloride Alum as a hardener to the above bath. After three or four minutes in this stop bath, it can be replaced with clear water for a rinse.

While the film is revolving in the rinse water, it is flashed by turning on the flashing lights; in fact, the negative is actually printed on to the same film. The denser the negative, the longer the flashing exposure will have to be, just as when printing from a negative on to another film. This time will have to be determined experimentally by each worker for his own setup of lights but the author's setup and data will serve as a guide. With a drum 14 inches long and 13 inches in diameter as shown in the illustration, holding 60 feet of film, the author uses two photoflood lamps with their centers 18 inches from the face of the drum. With normal camera exposure

and the suggested 30-minute first development, a flash of 10 minutes is about right. It is necessary that all flashing light must pass through the negative image so only a solid drum can be used in this method of reversing. The flashing is done while the film is being washed, if done without water in the tank the film will partially dry in places and print unevenly.

After flashing, the film goes through the same clearing and clearing operations as used in the previous method only it must be done under a red light instead of white as before. Careful clearing and washing of at least ten minutes are also required before the film goes back into the same developer for the second development. The positive image will develop up now very similar to that of a print from a negative and its development time should be judged accordingly. With the exposure and development data given here, the second development should take about three minutes, after which the film is fixed in an ordinary acid hypo bath until the remaining silver bromide is dissolved. The film is then washed and dried as explained under the total flash method.

Since in the printing method you are actually printing from the negative before destroying it the resulting positive



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When it comes to color...



C. F. JACOBS, Jr., makes this helpful suggestion

Weston Electrical Instrument Corp.,
Newark, New Jersey

Gentlemen:

Perhaps you will be interested to know that a Weston Exposure Meter was used constantly during the taking of the candid color pictures reproduced in the May issue of *Fortune*. Owing to the fact that the film employed for this work is processed by direct reversal, which reduces the range of permissible error in exposure within very narrow latitudes, it is essential that accurate exposure data be available and made use of. It was only after wasting several rolls of film and much time that I acknowledged the fallibility of my own judgment in the matter of correct exposure and turned to the Weston Meter for help.

The uniformly satisfactory results which followed upon the use of the meter were such that I will never again attempt to take colored pictures without one.

Very truly yours,

(signed) *Charles F. Jacobs, Jr.*

Weston Universal Exposure Meters are on sale at all leading dealers



WESTON *Exposure Meters*

The New Bee Bee Distance Meter ELIMINATES GUESSEWORK

any may be used. About 1/20 to 1/50 with both ends of roll camera. Gauge distance instantly with an accuracy of 1/100 inch, intervening from 2 ft. to infinity. You simply release film in its cassette, turn the dial until the two separate images of your subject are superimposed and read off your distance. Can be used as a hand meter attached to the tripod socket of any camera or that it is an integral part of the instrument or inserted into the range finder clip which can be attached to any part of your camera. Suggests, in construction of polished nickel-plated brass, compass, precise and of simple manipulation, the Bee Bee Distance Meter can not get out of order.



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will be more contrasty than that of the total flash method. Many amateurs will like the snappy black and white positive they get this way, but those who want softer results can try a softer developer for the negative development—D 76 should work nicely. Uneven exposure between the different scenes will be more noticeable in this printing type of re-veiling—the total flash method seems to smooth out the different densities—for this reason accurate camera exposure can not be urged too strongly.

The formulae given in this article are not the only ones that will work—there are plenty of other good ones too that

can be used after the amateur understands thoroughly what he is trying to do. However, the ones given are all of good keeping quality and may be bottled and used repeatedly until exhausted, although it isn't advisable to risk a good film on chemicals that have been used too often. The developer given is also good for titles and prints from negatives—also on some papers for still pictures.

It is hoped that the foregoing instructions will enable many amateurs to gain further enjoyment out of their cameras as there is nothing like the satisfaction gotten in doing all of the photographic work on your pictures.

Documentary Picture of the Old Farm

(Continued from Page 305)

scenes of feeding the chickens and let the youngsters of the farm take a hand in feeding the baby chicks. A closeup of the slip pail being stirred leads to other scenes of the pig pen. Get a shot of the hired man mucking through the mud in the pig pen and by all means a scene of the little pigs fighting for a place at the feeding trough. A comedy shot of an old hog scratching himself will always bring a laugh. One of the older children can hold a bucket of milk for the calf to good picture effect. If you can find a birdnest in the tree and get a shot at the mother feeding the babes, that will make a hit. A closeup of Dad as he says "grace" at the table and some few closeups of hands serving bountiful plates will tell the story from the family point of view.

To reach the very soul of simple country folk, search for a picturesque country church. Make an artistic general view of the church with effective framing and lighting. When the bell rings you will usually find one of the congregation manipulating three or more ropes with his hands and feet. Study the action and select convincing angles of his feet, his hands moving up and down across his face, the bells turning in the tower, then create a scene of unusual charm with this material to work with. Frame a church-lie door in the foreground and have some of the village folk coming up the path in the background as seen through the door. And all during this scene show the bell-ringer's arm pulling the rope in the near foreground.

An experiment in indoor photography is next in order. Four one-thousand watt lamps with convergent reflectors will illuminate enough of a small village church to tell the story. A scene of taking up the collection gives the opportunity for some action and a chance to work in closeups of the congregation as they give their notes, and the minister as he receives and blesses it. In using the lights, work for effects. Use two lights on one side of your subject, one on the

other and try to spot one for backlighting. For the scenes of the minister at the altar, create a beam of light as if coming in through a window and illuminate him principally from one side. End this sequence with some symbolic scenes such as a full view of a big Bible as the minister's hands close it, a stained glass window, a candle burning or a crucifix as shine lighted only with a beam.

To carry on the tempo of this subject, and yet to enable you to break away from the church sequence without abruptness, some artistic scenes of the countryside, trees, flowers, brook and clouds will fit in nicely. Extend this sequence with some shots of men working in the fields, loading hay, shocking corn or such, and concentrate every effort towards lifting these scenes from everyday category by creating artistic effects with lights and shadows, heavily filtered skies, silhouettes and cloud effects.

Exposing at the Exposition

(Continued from Page 310)

Scene 21. Telephoto sequence made in the "Globe Theatre" where Shakespearean plays are given in an unroofed auditorium just as they were presented in the time of Shakespeare.

Scene 22. Closeup of a bugler in the "U.S. Army Camp."

Scene 23. Ad lib scenes showing activities in the camp.

Scene 24. Medium long-shot, entrance to the Indian Village.

Scene 25. Long-shot of the Indian Village.

Scene 26. Closer shots of life of the Indians. Twenty-six tribes will be represented, offering innumerable picture possibilities in studies of their living arrangements, handicraft, etc.

Scene 27. Long-shot from the California Tower, as the sun drops into the Pacific. FADE OUT.

THE END

This outline, of course, barely touches upon the picture-possibilities of the fair. Almost every scene indicated here can

be expanded into a complete production if you have the time and the film available. "Gold Gulch," the Spanish Village, the bull-fights, the Indian Village and others, each offer sufficient material for a full 400-foot picture. The Midway and its people would make a fascinating audio-camera reel. The beauty of the various Palaces and buildings could be combined into a hauntingly beautiful pictorial reel.

In addition, the versatility possible with this suggested framework can suit almost any filmic need. The picture can be a straightforward documentary film of the fair itself, or it can be humanized with shots of your own party moving through the grounds and examining the exhibits.

Almost the entire fair can be filmed to better advantage in color, if you feel in so expansive a mood. Maneuver if you have fast lenses, the spectacular floodlighting played upon the buildings and fountains by night to total of 4,000,000,000 candlepower is said to be used throughout the fair will make a striking closing-sequence for your film.

The Motion Picture Hall of Fame is virtually the only building within which you will find sufficient illumination for photography; the others, while housing exhibits of great interest, are usually either too softly lighted or too crowded to permit even stop-motion camerawork.

If you are interested in filming wildlife, an additional sequence for picture can be made in the Zoo, which is one of the finest in the world. In this zoo the animals are apparently unconfined; you will not, in most cases, have to worry about shooting through bars and nets. Instead, you can film lions and tigers—apparently in their natural surroundings—in perfect safety, and if you are patient you can get scenes rivaling those of a Martin Johnson.

Putting Sound on Silent 16mm Film

(Continued from Page 35B)

be kept well in mind when writing the script which the laboratory will use.

The duplicate film is then taken and projected in a projector which is synchronized with the sound recorder, and the announcer follows the pictures as he reads the script. Naturally it is practiced several times before it is recorded. The actual recording is then made on a special 16mm sound film which is then reversed. This method is used because it cuts down background noise which is a problem in small film, and also gives the finest possible gain which becomes very important and when trying to record high frequencies on 16mm. The original picture is then printed on a special reversal duplicating film made for use by Agfa Ansco in a special optical printer. The sound track is then printed



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A picture is judged by its appearance on the screen. Even though it is a color picture, the photograph, if properly projected, will totally counteract the careful efforts of the cinematographer. It is apparent, therefore, that the screen should be carefully selected. Britelite-Truvision screens offer true color and ultimate performance in color and where projection as well as definition is important. More of this is available in Kodachrome.

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Last year the grand prize winner was an 8mm user. The year before it was also an 8mm user. The size of your equipment is no bar to your winning.

The entries must be in the offices of the American Cinematographer by midnight, November 30, 1935.

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on this same film on another printer and the whole is processed by the reversal method. This method gives you the final picture through only one duplicating process. It allows the laboratory to make correction in either the original picture or the sound track so that the best results are obtained. It gives a sound track with a high percentage of the high frequencies retained, and a freedom from background noise. The optical printer gives a picture hard to tell from original.

By recording direct on 16mm and making duplicates by the reversal method it is now possible to get sound on film at a much lower cost than ever before possible. By eliminating the duplicate negative step it is also possible to produce quality which is comparable to reduced 35mm film. In fact several professionals who have seen and heard these direct 16mm sound prints have sworn that they were reduced 35mm.

In direct 16mm the utmost care is used, every step is closely watched, and as many steps as possible are eliminated. When these rules are followed 16mm direct sound on film is very practical and should become more so. By this 16mm process a great many more people will be able to use sound pictures. The cost of adding sound to 16mm films is lower than ever before thought possible.

There is a very distinct use for 16mm in industrial films. There are a number of photographic dealers who have 16mm customers who make excellent movies, but they are sort of lifeless and useless for industrial use since sound entered into motion pictures. Hereafter is the only way to get sound on these pictures was to have it made on 35mm and then reduced to 16. This gave good sound, but it was necessary to make the picture by a dupe negative, and the cost of all this work naturally ran the cost up considerably, and any organization that could afford all of this could probably afford to have some industrial producer make the entire film. By direct 16mm sound the user of films with a limited budget can even make his own pictures, and then have the sound added, thus giving his pictures a punch impossible to obtain in any silent picture.

Gadget for Making Wipes

(Continued from Page 309)

stopping the camera. When the people at the side are filmed they can step from the scene while you are photographing those in front and can be replaced by new characters who will be filmed when you push the mirror back over the lens again. This can be kept up indefinitely depending upon how long the camera will run with one winding.

With this same gadget I have solved the problem of how to obtain a "turn-over" effect.

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Instead of inserting the mirror into the slit, I hold it against the back of the box (Fig. 4) and photograph this way through the mirror, which is then tilted backward to get the front scene in view of the lens (Fig. 5). The mirror could also be turned sideways like a door.

The box is made out of two layers of cardboard, between these cardboard is a thin sheet of tin cut the same size with a pair of scissors. It is then pasted together and covered with thin black paper.

Tiny Footsteps Thru the Day

(Continued from Page 511)

Scene 23 **CLOSEUP** of Mother's feet entering the scene. Mother gives the baby another light slap, and lifts him from the chair.

Scene 24 **CLOSEUP** of baby toddling hurriedly out of scene.

Scene 25 **CLOSEUP** of front door. Father's feet enter the door and stand. Baby's feet enter the scene, and are lifted up by Father. Camera follows baby's feet on a tilt, as Father tosses baby up into the air. Father sets the baby on the floor and the two pair of feet walk out of scene together.

Scene 26 **CLOSEUP** of Father's and baby's feet stopping before a chair. Father sits down. He lifts the baby up and bounces it on his knee. Suddenly he stops bouncing, rises from the chair, and holds the baby at arms length. His trousers are very wet. Mother's feet come into the scene. Her hand again feels the baby's pants.

Scene 27 **SAME AS SCENE FOURTEEN**

Scene 28 **SAME AS SCENE FIFTEEN**

Scene 29 **SAME AS SCENE SIXTEEN**

Scene 30 **SAME AS SCENE SEVENTEEN**

Scene 31 **CLOSEUP** of Father trying to untie the baby. He has great difficulty in getting the parties off. He then begins to endeavor to untie the shoes. The laces become knotted. Father's fingers are seen fumbling fearfully to untie the knots. The baby is squirming, therefore making it more difficult for Father. One of Father's hands leaves the scene, and re-enters holding a pocket knife. He is about to cut the shoe laces and Mother's feet hurry into the scene. She takes the pocket knife away from Father, then takes the bow.

Scene 32 **CLOSEUP** of Mother sitting down in a chair with the baby on her lap. She removes the shoes with perfect ease.

Scene 33 **CLOSEUP** of baby's feet being put into bath-tub.

Scene 34 **CLOSEUP** of sleepers hy-

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ing put on the baby. Mother picks up baby and places it in the crib.

Scene 35 **MED SHOT** of the baby, asleep with an angelic expression on its face. Mother bends down and looks down at baby for a minute, a loving

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smile on her face. Scene fades as Mother kisses the baby goodnight.

Scene 36 **TITLE** And as the sands of time erase his tiny footsteps from another day.

THE END

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Each question should be answered in less than half a minute

If your camera is running 8 times normal how long will it take to expose 400 feet of film?

If your camera is running 4 times normal how many feet of film will you expose in 55 seconds?

If F 2.8 is the correct lens stop for 24 frames per second, what should the stop be for 48 frames per second?

If F 11.3 would be the right stop with the shutter set at 170 degrees, what would be the lens opening with the shutter at 40 degrees?

When is an 88 filter used and for what purpose?

What is the filter factor of a 5M5 filter for Eastman Film? For Dupont Film? For Agfa Film?

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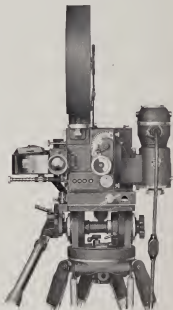
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